

Mr. Richard P. Doss
County Engineer
County of Harris
1115 Congress Street
Houston, Texas 77002

Dear Mr. Doss:

This is in further response to your letter of February 27, 1978, to Mr. Robert F. Aubry, Chief, Southwest Region, concerning the crossing of county highways by gas pipelines.

Your letter states that placement of line markers in accordance with 49 CFR 192.707 at highway crossings at locations other than highway right-of-way lines creates difficulties in mowing and in maintaining roadway shoulders. In this regard, you ask whether a County Order which, among other things, requires markers at right-of-way lines, qualifies under Section 192.707(b) as a "program for preventing interference with underground pipelines" that would exempt pipelines in Class 3 and Class 4 locations from the Section 192.707 line marking requirement.

We have reviewed the County Order and find that it does not establish a "program" that would entitle gas pipelines to an exemption under Section 192.707(b). The "program" contemplated by Section 192.707(b) is one, such as the commonly referred to "one-call system," which serves as an alternative to line marking. A qualified program compels both pipeline operators and construction contractors to cooperate in carefully identifying the location of underground pipelines before construction activities may begin. In contrast, the County Order does not contain these features. It is written more to protect the highway against the possible hazards of a pipeline crossing than to protect the pipeline from damage by further construction activities at the crossing. Although the requirement for placement of line markers at right-of-way boundaries does offer protection against unintended interference, it is not a "program" which serves as an alternative to line marking within the meaning of Section 192.707(b).

For most normal rights-of-way, it seems that placement of markers at each right-of-way should meet the requirements of Section 192.707. In some cases, however, markers at right-of-way lines may not meet the intent of Section 192.707 if they do not definitively identify the location of the

pipeline, or are too far removed from the actual road crossing or potential sites for excavation, to serve any useful purpose in warning an excavator of the presence of an underground pipeline.

In such cases, we believe that your problem could be resolved if the County were to discuss it with pipeline operators and suggest ways to install markers which do not interfere with mowing and shoulder maintenance but still meet the line marking requirements of Section 192.707.

Sincerely,

Cesar De Leon
Associate Safety Regulation
Materials Transportation Bureau

Mr. Richard P. Doss, County Engineer
Room 650 Family Law Center Building
1115 Congress Street
Houston, Texas 77002

Dear Mr. Doss:

Reference is made to your letter of February 27, 1978, regarding Section 192.707, Line Markers for Mains and Transmission Lines.

In order to expedite this matter, your letter and the attachment has been forwarded to our Washington office with the request that a reply be forwarded directly to you.

If this office can be of further assistance, please let me know.

Sincerely,

Robert F. Auby
Chief, Southwest Region
Office of Pipeline Safety Operations

Mr. Robert F. Aubry
Chief
Department of Transportation
Southwest Region OPSO
6622 Hornwood
Houston, Texas 77074

Dear Mr. Aubry:

Recent review of D.O.T. Regulations for the Transportation of Natural and Other Gas by Pipeline, Parts 191 and 192, has made it necessary to request an opinion from your office.

Certain problem areas exist between Section 192.707, Line Markers for Mains and Transmission Lines, and the pursuance of normal maintenance procedures by Harris County forces in the field. To be specific, the presence of line markers at locations other than right-of-way lines creates severe difficulties in mowing and in the maintenance of roadway shoulders.

In the opinion of this office, the limitation of markers to right-of-way lines is both advantageous to Harris County and well within the realm of safe practice. This opinion is supported in the Utility Accommodation Policy of the Texas Department of Highways and Public Transportation, Sections 402 and 403, concerning markers for both high and low pressure pipelines, which has been incorporated into the Harris County Pipeline Regulations, a copy of which is enclosed.

Both sets of regulations state that "the utility company shall place a readily identifiable and suitable marker at each right-of-way line where it is crossed by any high (low) pressure gas or liquid petroleum line except where marked by a vent.

A method of solving the maintenance problems of Harris County and full compliance with D.O.T. Regulations presents itself in Section 192.707 of Part 192, Title 49 of the Code of Federal Regulations. It is this method upon which our request for an opinion is based.

It is clearly stated in Section 192.707(b) that "line markers are not required for buried mains and transmission lines (2) in Class 3 or Class 4 locations (i. i.) where a program for preventing interference with underground pipelines is established by la.

Population density and land development indicated that at present almost all of Harris County qualifies as either a Class 3 or Class 4 location, as outlined in Section 192,5 of your regulations, and that this will certainly be the case in the near future.

If this blanket qualification of Harris County as falling into Class 3 or Class 4 locations is coupled with "a program for preventing interference...established by law" in the form of the attached Harris County Pipeline Regulations, then a viable Solution to our problem exists.

Please review this situation and render an opinion as to the validity of our interpretation of the intent of your regulations.

Your assistance in this matter will be greatly appreciated.

Very truly yours,

Richard P. Doss
County Engineer

A REVISED ORDER REGULATING THE LAYING, CONSTRUCTION, MAINTAINING AND REPAIRING OF PUBLIC UTILITY PIPELINES, AND/OR MAINS, IN, UNDER, ACROSS OR ALONG ROADS, STREETS, AND HIGHWAYS IN HARRIS COUNTY, TEXAS, UNDER THE JURISDICTION OF THE COMMISSIONERS' COURT OF HARRIS COUNTY, THAT QUALIFY AS AUTHORIZED PUBLIC UTILITY PIPELINES AND/OR MAINS

ADOPTED BY

COMMISSIONERS' COURT

MAY 12, 1977

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It is the intent of Harris County to amend our current rules and regulations for installing, adjusting and maintaining pipelines to adapt these specifications to those of the State of Texas and the Federal specifications and guidelines as set forth by the Department of Transportation. Any omission or deletion from these specifications that is contained in the State and Federal specification shall be construed as being contained herein.

These revised specifications cover all public utility pipelines and/or mains, in, under, across or along all County roads, streets and/or highways in Harris county, Texas, under the jurisdiction of the Commissioners' Court of Harris County, Texas. owned and operated by any person, firm, limited partnership, joint stock association, or corporation having the right to lay his or its pipeline or pipelines and/or mains, under, along, across and/or over County roads, streets, and/or highways by virtue of his, its or their qualifications as authorized public utility pipelines and/or mains, under and/or by virtue of the Revised Civil Statutes of Texas, (1925), as amended, hereinafter called pipeline and/or pipelines, shall henceforth be laid, and/or constructed and/or maintained and/or repaired under the following regulations and provisions:

- I. That said pipeline and/or pipelines shall not be laid or constructed in, under, across or along such County roads, streets, and/or highways prior to furnishing to the County Engineer of Harris County, Texas, the following information: surveys, description and other data:
 - a. Notice of pipeline activity, upon the notice form herein adopted by Commissioners' Court, an example of which is attached hereto, which when completed shall show the name of the person or entity desiring to initiate any pipeline activity; the pipe size, wall thickness of the pipe; grade of the pipe; type of material or substance being or to be carried in the pipe' and the anticipated working pressure. If the pipeline crosses or is to cross any County road, the following additional information shall be given in the blanks provided for same on such form, road name, survey and abstract, length of crossing, and the type of construction, whether bored, jacked, driven, tunneled or open cut under the road. If the pipeline runs or is to run parallel to any County road within such roads, right-of-way, then in addition to naming such road, there will be added a description of the point at which such pipeline begins as well as a description of the point at
 - b. To such notice form shall be attached a map or plat reflecting the distance and direction of such pipeline or pipelines, through Harris County, Texas, as it affects the County roads, streets and highways of Harris County, Texas.

- c. To such notice form shall attached detailed plans and specifications for the construction under, across or along any County road right-of-way, such plans and specifications to reflect the depth at which such pipeline or pipelines are to be constructed along and/or across such County road right-of-way, size and other information necessary to reflect accurately the manner in which such pipeline will be constructed, in under, across or along such County road right-of-way.
- II. No pipeline shall be laid, maintained or repaired in such a manner as to interfere with the construction, maintenance or repair of the County road, roadbed, ditches or right-of-way in, over, across or along which such pipeline is constructed, and in the event it shall develop that such pipeline interferes in any manner with the construction, maintenance or repair of any County road, in, under, across or along which it is constructed because of the depth at which such pipeline has been laid, because of the widening, improving, maintaining or for reasons of public safety and welfare, upon request of the County Engineer such pipeline shall be changed to altered promptly under the existing right-of-way by the owner and/or operator of such pipeline in such a manner as to interfere no longer with such construction, maintenance, repair or the safety of the traveling public, and the owner and/or operator of such pipeline shall, if demand therefore is made by the Commissioners' Court of Harris County, bear all or a reasonable part of the cost and expense of such change or alteration.
- III. No pipeline shall be laid in such a manner as to interfere with the use of or obstruct unreasonably a County road for the purpose of vehicular and pedestrian traffic, or so as to interfere with or unreasonably obstruct any drainage on or along such road, and no such pipeline shall be laid, maintained or repaired in such a manner as to constitute a danger or hazard of any kind to persons or vehicles using such road, nor shall any pipeline be laid, maintained or repaired so as to constitute a danger or hazard to the public property within the boundaries of the right-of-way of said County road, or to maintenance thereof by County employees.
- IV. That all pipelines that cross improved County roads shall be either jacked, tunneled, bored or driven under the road for the full width of the improved portion of the road. Improved County Roads as herein used are defined as any road surfaced with a material other than dirt and the improved portion as that portion of the road and shoulder lying between the backslope of each ditch.
- V. Depth of Cover for High Pressure Pipe Lines

- A. All pipelines that cross unimproved County roads shall be laid at a depth of 6 feet below natural ground.
- B. All pipelines that cross County roads with open-ditch drainage shall be laid a minimum of 36" below the bottom of ditch.
- C. On curb and gutter sections all high pressure pipelines that cross County roads shall be installed at least 24" below the bottom of the slab at the gutter; provided however, in particular instances where it is determined by the County Engineer that a greater depth is required, such pipeline shall be installed as directed by the County Engineer.
- D. In particular instances where it is determined by the County Engineer that a greater depth for a particular pipeline should be required due to the location or size of same, the type of product carried or other reason of public safety or necessity, such pipeline shall be laid at such greater depth as may be required by the County Engineer, but not to exceed the greater of the following depths: At least eight (8) feet below the crown of the road or four (4) feet below the bottom of the ditches on each side of such County road, unless by reason of proposed or anticipated changes in the grade of such County road or road ditches, the County Engineer should determine a greater depth is advisable.

V.

1. Depth of Cover for Low Pressure Pipe Lines

For low pressure gas lines the minimum depth of cover within the right-of-way and under roadway ditches, but outside the pavement structure, shall be twenty-four inches for either encased or u--encased installations. Exceptions may be authorized to permit existing lines to remain in place with a reduction of six inches in the above specified depth. Low pressure gas lines shall be a minimum of eighteen inches or one-half the diameter of the pipe, whichever is greater, beneath the bottom of the pavement structure. Where materials and other conditions justify, such as on existing lines to remain in place, a minimum depth under the pavement structure of twelve inches or one-half the diameter of the pipe, whichever is greater, may be permitted.

As used herein, depth of lines is the depth to the tope of carrier pipe or casing as applicable.

- IV. Any damage whatsoever to any County road, roadbed, ditches, or the structure on or in the County road right-of-way caused by reason of the laying, constructing, maintaining and repairing of a pipeline, in, under, across or along such County road right-of-way shall be repaired immediately and restored to the condition that such County road, roadbed, ditches or other structures on or in such right-of-way was in before the damage took place, such repairing and restoration to be at the sole cost and expense of the owner or operator of such pipeline.
- VII. Where a pipeline or pipelines are constructed parallel with a County road and where dirt is piled along the side of the trench cut for such pipeline, weep holes shall be dug through such pile of dirt in order that water may drain from roadbed and shoulders to the road ditches. Such weep holes shall be dug through such piles of dirt at intervals not to exceed two hundred (200) feet along such parallel pipeline construction, and at all swags or low places in the roadbed of such County road. Such weep holes shall be dug to a depth of six inches below the shoulder of such County road and shall be dug for a width of twelve (12) inches, and such weep holes shall be dug through the piles of dirt to the road ditches, or to such an elevation that the bottom of the weep holes will discharge its water into the road ditch. Such weep holes must be maintained free of obstruction until the pipeline is completed and the pipeline trench backfilled, tamped and leveled true to the original shoulder grade.
- VIII. All high pressure pipelines installed across Country roads shall be protected by a 6 inch thick reinforced concrete pad as follows:
1. On curb and gutter streets the pad is to extend from back of curb to the right-of-way line flush with finished ground level.
 2. On roads with open ditch drainage the length of the pad is to be the width of the ditch bottom plus 2 feet on each side, and the bottom of the pad to be 6" above the top of the pipe.
 3. All pads are to be the outside diameter of the pipe plus 4 feet in width.
 4. Reinforcing is to be No. 4 bars at 6 inch centers both ways.

- IX. All pipelines laid, constructed, maintained and/or repaired parallel to and within the right-of-way of any County Road shall be laid, constructed, maintained, and repaired at a distance of not less than four (4) feet from the edge of the portion of road considered as normal traveling surface to the nearest edge of such pipeline; and when possible all pipelines shall laid, constructed, maintained and repaired in the area considered as the backslope of the ditch. These underground installations shall be at such depth so as to provide a minimum of 24" cover above top of pipe.

On curb and gutter sections all installations paralleling the road shall be behind the curb and gutter.

When installation of any pipeline within County right-of-way requires the digging of pits or trenching to such depth that the angle of repose created with respect to the edge of the normal traveling surface of the road exceeds 33°41'24" (1 ½: 1 slope), the owner and/or operator shall at its own expense furnish the County Engineer with soil testing laboratory reports indicating if sheeting is required to safely preserve the road. If reports indicate sheeting is required at various areas or for the entire length of trench, it shall be installed by owner and/or operator at no expense to Harris county.

Spacing for soil tests shall be at 1000' intervals unless soil indicated tests should be made at shorter intervals or as directed by the County Engineer.

The County Engineer will maintain an list of testing laboratories which he has approved and furnish a copy thereof to any person requesting same.

- X. At least forty-eight (48) hours before commencing construction of any pipeline in, under, across or along any County road, notice of the time such construction shall commence shall be given to the County Engineer of Harris County in order that he might supervise and inspect such construction; provided however, that in cases of emergency requiring immediate maintenance or repair of any pipeline, notice should be given to the County Engineer as soon as possible, and when planned major maintenance is proposed, notification shall be given as outlined under Section 1.

- XI. Backfilling operations shall be performed as soon as possible. Back fill material shall be free from large or frozen lumps, wood or other extraneous material. The backfill shall be placed in uniform layers not to exceed 10

inches depth (loose measurement) and each layer thoroughly compacted to the density of the surrounding area and to the satisfaction of the County Engineer. However, if any pit or trench lies outside the angle of repose defined in Section VIII, backfilling operations may be preformed by the equipment method so long as compaction is to density of surrounding area.

Operation of equipment on the improved surface of any County road will not be permitted, except in an instance whereby the laying, constructing, maintaining, and repairing of pipelines cannot be accomplished by any other method, and in this event all such equipment shall be equipped with rubber tires, flat street pads or other similar means to assure complete protection of the improved surface of the road.

These specifications govern on matters concerning accommodation, location and methods for the installation, adjustment, relocation and maintenance of utilities on right-of-way, it does not alter current policies pertaining to authority for their installation nor determination of financial responsibilities for placement or adjustment thereof. Where industry or governmental codes, orders or laws require utilities to provide a higher degree of protection than provided herein, the higher degree of protection shall prevail.

Pipe Design

Pipe must be designed with sufficient wall thickness, or must be installed with adequate protection, to withstand anticipated external pressures and loads that will be imposed on the pipe after installation.

Design formula for steel pipe

- (a) The design pressure for steel pipe is determined in accordance with the following formula:

$$P = \frac{2St}{D \times F \times E \times T}$$

P = Design pressure in pounds per square inch gauge.

S = Yield strength in pounds per square inch determined in accordance with Sec. 192.107.

D = Nominal outside diameter of the pipe in inches.

t = Nominal wall thickness of the pipe in inches. If this is unknown, it is determined in accordance with Sec. 192.109. Additional wall thickness required for concurrent external loads in accordance with Sec. 192.103 may not be included in computing design pressure.

F = Design factor determined in accordance with Sec. 192.111.

E = Longitudinal joint factor determined in accordance with Sec. 192.113.

T = Temperature derating factor determined in accordance with Sec. 192.115.

NOTE: All items 191, 192 or 195 referred to in these specifications refer to the regulations for the transportation of natural and other gas by pipelines as revised October 1, 1973 by the Dept. of Transportation Office of Pipeline Safety.

Design factor for steel pipe

- (a) Except as otherwise provided in paragraph (b) of this section, the design factor to be used in the design formula in Sec. 192.105 is determined in accordance with the following table:

Class location	Design factor (f)
1	0.72
2	0.60

- (b) A design factor of 0.60 or less must be used in the design formula in Sec. 192.105 for steel pipe in Class 1 locations that:

- (1) Crosses the right-of-way of an unimproved public road, without a casing:
- (2) Crosses without a casing, or makes parallel encroachment on the right-of-way of either a hard surfaced road, a highway, a public street, or a railroad.

UTILITIES

This term, where used herein, applies to all lines and or their accessories within the roadway rights-of-way.

LOW VOLUME ROADWAYS

Any roadways which carry traffic volumes of 750 vehicles per day or less and upon which projected traffic volume at the design year are not anticipated to exceed 1,300 vehicles per day.

HIGH AND LOW PRESSURE GAS LINES

High pressure gas lines are pipelines which carry a gaseous substance and which are operated or may reasonably be expected in the future to operate at a pressure of over 60 pounds per square inch. Conversely, low pressure gas lines are those with an operating pressure not expected to exceed 60 pounds per square inch.

LOCATION

- (1) Utility lines shall be located to avoid or minimize the need for adjustment for future roadway improvements and to permit access to the utilities for their maintenance with minimum interference to roadway traffic.
- (2) Utility lines crossing the roadway should be located at approximate right angles to the road.
- (3) Methods of Installation. Lines placed under any existing roadway shall be installed by boring or tunneling in accordance with appropriate specifications. Jacking may be used only when approved by the County Engineer. When installed by jacking or boring, encasement of the line may be required. Bore pits should be located at least thirty feet from the edge of the nearest through traffic lane and not less than twenty feet from the edge of pavement. On low traffic roadways, bore pits should not be less than ten feet from the edge of pavement or five feet from face of curb. Adequate warning devices, barricades and protective devices will be

used to prevent creation of a traffic hazard. Where circumstances necessitate the excavation of a bore pit closer to the edge of pavement than set forth above, guard fence or other approved protective devices will be installed for protection of the traveling public in accordance with current Harris County standards. Bore pits should be located and constructed in such a manner as not to interfere with roadway structural footings, safe roadside clearance or traffic operations. If necessary, shoring shall be utilized.

Crossings Pipeline installations across roadways may be encased or un-encased. Where encasement is to be employed such encasement shall be provided under center medians and from top of backslope to top of backslope for cut sections (or five feet beyond the toe of slope for fill sections, or face of curb) of all roadways including side streets, and five feet beyond any overpass or other structures where the line passes under it. Encasement may be omitted under center medians where their width is appreciably greater than normal standards.

Where encasement is not employed the welded steel carrier pipe shall provide sufficient strength to withstand the internal design pressure and the dead and live loads of the pavement structure and traffic. Additional protective measures should include the following:

- (a) Heavier wall thickness and/or higher factor of safety in design
- (b) Adequate coating and wrapping
- (c) Cathodic protection
- (d) Other measures as required by Title 49, CFR, Part 192 or Part 195 as published by the Department of Transportation.

The minimum length of the additional protection as set forth above shall be the same as that required by encasement.

Existing lines may be permitted to remain in place without encasement or extension of encasement if they are protected by a reinforced concrete slab or equivalent protection or if they are located at a depth of six feet under the pavement surface and not

less than four feet under the roadway ditch. If a reinforced concrete slab is to be used, it should meet the following standards:

Width	Three times the diameter of the pipe or five foot minimum whichever is greater
Thickness	six inch minimum
Reinforcement	#4 bars at twelve inch centers each way or equivalent wire mesh
Cover	the cushion between the bottom of slab and top of pipe shall be not less than six inches
Backfill	will be 1.5 sacks Cement Stabilized Sand full width of cut and from pad to bottom of subgrade,

Vents. One or more vents shall be provided for each casing or series of casings. For casings longer than 150 feet vents should be provided at both ends. On shorter casings a vent should be located at the high end with a marker placed at the low end. Vents shall be placed at the right-of-way line immediately above the pipeline, situated so as not to interfere with highway maintenance or concealed by vegetation. Ownership of the lines shall be shown on the vents.

Markers. The utility company shall place a readily identifiable and suitable marker at each right-of-way line where it is crossed by any high pressure gas or liquid petroleum line except where marked by a vent.

The authorized pipeline shall save and hold harmless Harris County against any and all liability that it may have or appear to have to any person or persons whomsoever by reason of any act or thing that pipeline, its agents, servants, employee and contractors may do or cause to be done on the premises.

- XII. Any authorized pipeline as used herein, violating any one or all of the above regulations and provisions set forth shall be deemed to be in contempt of this Court, and shall be called to show cause before this Court why he should not be held in and punished for contempt for his conduct in violation of the above orders and regulations of this Court.

- XIII. If any provisions, section, subsection, sentence, clause or phrase of this order, or the application of same to any person, firm, limited partnership, joint stock association, or corporation, or set of circumstances is for any reason held to be unconstitutional, void or invalid (or for any reason unenforceable), the validity of the remaining portions of this order or their application to other persons, firm, limited partnerships, joint stock associations, or corporations, or set circumstances shall not be affected thereby, it being the intent of the Commissioners' Court of Harris County, Texas, in ordering the above regulations and provisions that no portion hereof or provision or regulations contained herein shall become inoperative or fail by reason of any unconstitutionality or invalidity of any other portion, provision or regulation, and to this end, all provisions of this order are declared to be separable.
- XIV. Evidence of review by the Commissioners' Court shall be kept on the jobsite at all times and failure to do so constitutes grounds for job shutdown.
- XV. Owners and/or operators of public utility pipelines and/or mains shall not be required to submit formal notice when installing service connections. However, owners and/or operators shall install these connections in accordance with the construction requirements set out herein, and if unusual conditions exist that require variation from the requirements, work shall not begin until approved by the County Engineer.
- XVI. One of the following bonds payable to Harris County shall accompany "Notice of Proposed Public Utility Pipeline and/or Main Activity within Harris County Road Right of Way" unless one perpetual bond is executed as stipulated in following paragraph (3).
- (1) A bond with two good and sufficient personal sureties, a corporate surety bond, or a personal bond, if acceptable to the Commissioners' Court of Harris County, Texas, acting in its sole discretion upon proof being furnished to the satisfaction of said Court as to the financial responsibility of such authorized pipeline desiring to make such crossing and/or crossings, for each crossing of such pipeline over a County road right-of-way or for each one mile or part of one mile such pipeline runs parallel with and within the boundaries of such County road right-of-way.

- (2) In the event the construction of one continuous pipeline is to be made in, over, across and along several County road rights-of-way, one such bond covering all construction of such pipeline in, under, across, or along the several County road rights-of-way affected by such continuous pipeline construction.
- (3) One perpetual bond, executed solely by such authorized pipeline, if acceptable to the Commissioners' Court of Harris County, Texas, acting in its sole discretion upon proof being furnished to the satisfaction of said Court as to the financial responsibility of such authorized pipeline, such perpetual bond to cover all pipelines thereafter laid or constructed by such authorized pipeline in, under, across or along any County road in Harris County, Texas, under the jurisdiction of the Commissioners' Court of Harris County, Texas.

The amount and terms of each of the above bonds to be determined by the Commissioners' Court of Harris County, Texas, or the County Engineer of Harris County, Texas, and each of the bonds to be conditioned that the pipeline or pipelines covered thereby be laid, constructed, maintained and repaired so as to comply with the herein established minimum requirements and conditions for such laying, constructing, maintaining and repairing of such pipeline or pipelines, in, under, across, and along such County road right-of-way.